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## No. LXXIV.

*MEMOIR on the Extraneous Fossils, denominated Mammoth Bones: principally designed to shew, that they are the remains of more than one species of non-descript Animal.*  
By GEORGE TURNER, Member of the A. P. S.  
Honorary and Corresponding Member of the Bath and West of England Society, &c.

Read, July, 21st 1797. **T**HE interesting remains which form the subject of this Memoir, have excited various conjectures concerning their nature and origin. By some they were thought to be mineral substances; and by others, animal. The latter opinion soon prevailed, and is now universally received.

But another question remained to be answered:—To what animal, or class, were the bones to be assigned? Here was a difficulty not so easy to overcome. It engaged the attention and drew forth the labours of several eminent men. Some ascribed them to the elephant;\* others to the hippopotamus; and others, again, to some unknown creature, larger than either, and of the carnivorous kind.† To this animal incognitum common consent has given the name of Mammoth.‡

Deposits of his remains are very frequently found in Siberia and other parts of the old world. In North America

\* As Sir Hans Sloane, Gmelin, Daubenton, Buffon, &c. Buffon, however, admits that they bespeak an animal whose cubic volume must have exceeded, by five or six times, that of the elephant.

† Dr. Wm. Hunter. *Vide* Trans. Roy. Soc. vol. LVIII. p. 42: also "Notes on Virginia."

‡ Strahlenberg, in his Historico-Geographical Description, observes, that the Russian name is *Mammoth*; which is a corruption from *Memoth*, a word derived from the Arabic, *Mebemot*, signifying the same as the *Behemot* of Job. This word is applied to any animal of extraordinary bigness: for instance, *Fybl* is the Arabic appellation for an elephant of ordinary size; but when of uncommon magnitude, the adjective *Mebemodi* is always added.

rica they are abundant. The countries bordering upon the Ohio and its tributary streams, have already furnished numerous discoveries of the kind; and, it is said, the banks of the Missouri, also, abound with them.

Nature having blessed our transmontane regions with a bountiful supply of salines, or springs of salt water; the earth there being soft or spongy and impregnated with mineral salts, is rendered peculiarly fit for the reception and preservation of certain bodies which, in other places, would undergo a speedy decay. Hence the profusion of Mammoth bones beyond the mountains; while on the Atlantic side of them, where salines are scarce, such remains have but rarely been found:—I speak here comparatively.

Hitherto but few of the remains in question have appeared to the southward of the 36<sup>th</sup> degree of north latitude: and hence an opinion, that the Mammoth was not an inhabitant of the warmer climates. The ingenious author of "*Notes on Virginia*" seems to be influenced by this belief when, alluding to some discoveries made farther south, he observes, —"They are either so loosely mentioned, as to leave a doubt of the fact; so inaccurately described, as not to authorize the classing of them with the great northern bones; or so rare, as to found a suspicion that they have been carried thither, as curiosities, from more northern regions."

Since the publication of the "Notes," however, at least one additional fact has occurred, that favours the assigning of a *wider* range to this incognitum: for, in cutting the Santee and Cowper river canal in South-Carolina, there was lately turned up a collection of bones, answering by description to those of the Mammoth. Their number, variety, and arrangement were such, as forcibly to preclude the idea of their having been "carried thither as curiosities."\*

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\* Since writing this paper, similar remains have been discovered at Wilmington and near Newbern, both in North-Carolina and without the limits above suggested for the residence of the Mammoth.

The late Dr. W. Hunter was the first to relieve the learned from an error they had long indulged. Having carefully compared a few specimens of the American bones with others of the Siberian non-descript, and these again with similar parts of the elephant, hippopotamus, &c. he became convinced, that the two first were vestiges of one and the same species of animal; but differing essentially in size and form from the bones of any other at present known to us: that, consequently, they were not parts of the elephant, nor of the hippopotamus; but of some huge carnivorous animal.\*

Had the opportunities of this accurate observer been greater than it appears they were; or, in other words, had his materials been less scanty, he would have discerned the remains of a second incognitum, whose stature was not, perhaps, inferior to that of the other. These second remains evince a member of the *herbivorous* order; and, from their extraordinary size, I have no hesitation in believing, that they belonged to some link in the chain of animal creation, which, like that of the Mammoth, has long been lost.†

Both skeletons of these incognita being usually embedded in company, they have hitherto been confounded together by writers, under the single appellation of Mammoth bones.

The parts which more decidedly mark the remains of a second animal, consist, first, of a grinder exclusively worn by those of the herbivorous or graminivorous kind; and, secondly, of two tusks (*defenses*) differently fashioned.

Although I do not presume to assert, that, contrary to the received opinion, neither of these tusks belonged to the Mammoth: yet if the nature of his pursuits be considered, taking it for granted, as I shall endeavour to shew, that he was partly (if not wholly) carnivorous;—that there

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\* Trans. Roy. Soc. vol. LVIII. p. 42.

† It is with reluctance, that I feel myself constrained to offer here an opinion so contrary to that which has been held by two such able writers as Mr. Jefferson and Mr. Pennant.

is no place for their insertion in the lower jaw, (the upper I have not seen) and that such tusks would appear to be incompatible with the natural pursuits of such a creature—we can we hesitate to ascribe them to some other animal?

I shall confine my ideas to *two* distinct skeletons only; since no discovery has yet occurred of a third tooth, or other bone, to justify the dividing of the tusks between a second and a third description of *incognita*. I am neither prepared to admit nor deny, that *defenses*, so differently fashioned as these will appear, were worn by one and the same animal: and yet, the probability is, that neither of them belonged to the Mammoth. The difference between the *defenses* is indeed remarkable. One of them, the longer of the two, bears a near resemblance, in size, form and substance, to the tusk of an elephant: the other describes a greater curve, and is so flattened or compressed on two opposite sides, in its whole length, as to produce a greater breadth than thickness, in the proportion of about two parts and a half to one. The curvature inclines on the edges; that is, the tusk is bent edgewise. Both *defenses* are good ivory.

With respect to the teeth, all that I have seen of either kind are *dentes molares*. They unquestionably bespeak the remains of two distinct species of non-descript animals; the one carnivorous, or mixed; the other herbivorous, or graminivorous.

The masticating surface of the Mammoth tooth is set with four or five high double-coned processes, strongly coated with enamel: whereas that of the other *incognitum* is flat, nearly smooth, and ribbed transversely, somewhat like the elephant's grinder, but less prominently marked. The writer has counted from fifteen to twenty of these transverse lines on a single tooth of this second *incognitum*; while on that of the elephant, they seldom exceed half the number.

The lower jaw of the Mammoth is furnished with four teeth, two on each side; and being unassociated either with *incisores* or *canini*, it may reasonably be inferred, that this animal was of a nature not wholly carnivorous, but mixed.

Another part of what we term Mammoth remains, consists of fragments of ribs of a singular construction; being all bent on the edge. Such a form is eminently calculated for strengthening a frame which, perhaps, was ordained to subsist by the destruction of other animals, both active and powerful.

I shall take the liberty to give, in this place, the substance of a few observations made by certain writers concerning the Mammoth skeleton. It may assist us in forming some idea of the uncommon stature of the animal.

In the Memoirs of the American Academy of Arts and Sciences, vol. II. part 1st, there is a description of a tusk found several years ago in the river Chemung, or Tioga, a branch of the Susquehannah. It was six feet nine inches long, twenty-one inches around at the larger end and fifteen at the smaller; and was incurvated nearly into the arc of a large circle. This, however, was but a fragment; for it appeared as if the length of two or three feet had perished at each end.

Strahlenberg\* relates, that an entire skeleton of the Mammoth was discovered in Siberia, near lake Tzana Osero; that it measured thirty-six Russian ells in length;† and so great was the distance between the opposite ribs, that a man standing upright on the concavity of a rib, as the skeleton rested on its side, could not quite reach the opposite one, though with the aid of a pretty long battle axe which he held in  
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\* Historico-Geographical Description of the North and Eastern Parts of Europe and Asia, p. 104.

† The Russian ell is equal to  $28\frac{1}{5}$  inches English.

his hand. This account is given as coming from the mouth of the man himself, and who was one of thirty others, all eye witnesses to the fact. Strahlenberg then observes, that a Doctor Mefferschmidt had seen the bones of a whole skeleton of a monstrous size, lying in a heap in a ditch between Tomskoi and Kafnetsko, on the banks of the river Tomber. He next tells us what he himself had seen. He saw, at the city of Tumeen, a skull of the Mammoth, two ells and a half in length : but this the Russians informed him was one of the smallest size. He had also seen Mammoth tusks, each upwards of four Russian ells in length, and nine inches in diameter at the thick end.

It is to be regretted, that the world has not yet been favoured with a particular and scientific description of the whole skeleton of an *incognitum* so interesting as the Mammoth. Both Muller and Isbrandes Ides, indeed, have gone so far, as to describe his structure, size, colour, &c. But what credit can be given to such idle stories, when Ides himself confesses, that he knew of no person who had ever seen a living Mammoth? The person who shall first procure the complete skeleton of this *incognitum*, will render,—not to his country alone, but to the world,—a most invaluable present.\*

In my mind it is highly probable, that both species of *incognita* in question, have long since perished. This opinion derives countenance from several discoveries of other fossil bones, in Germany, in South-America, and in Virginia. We are now acquainted with the skeletons of five several large animals, all of whom are, at present,

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unknown :

\* I have often expressed a belief, that whenever the entire skeleton should be found, it would appear to have been armed with claws. I am now more confirmed in the opinion ; for after this Memoir was written, the Society received a collection of the bones here treated of, and among them the os calcis, or heel bone, of a *clawed* animal.

unknown: and as two of those skeletons\* were but recently brought to light, may we not expect to be gratified, in these times of research, with other discoveries of a similar kind? Can we believe, then, that so many and such stupendous creatures could exist for centuries and be concealed from the prying eye of inquisitive man?

The benevolent persuasion, that no link in the chain of creation will ever be suffered to perish, has induced certain authors of distinguished merit,† to provide a residence for our Mammoth in the remote regions of the north. Some of the North American Indians also believe in the now existence of this animal, and place him far beyond the lakes. But their belief rests on mere tradition: for none of them will venture to declare they have seen the animal themselves, or that their information concerning him, is drawn from any person who had. Their tradition is to this effect. "In ancient times," say they, "a herd of Mammoths came to the Great-Bone Lick, and began a universal destruction of the bears, deer, elks, buffaloes and other animals. It so provoked the Great Man above to see the havoc thus spread among creatures designed for the use of his favourite Red Men, that he killed all the Mammoths except the big bull, who fled wounded beyond the lakes, where he is living to this day."

There is little or no dependence to be placed on Indian traditions. They are so clouded with fable, as to obscure any truths they may happen to contain. The above tradition, indeed, is not exactly of this description, though it partakes largely of the fabulous: There is a truth in it, which my personal acquaintance with the Great-Bone Lick has

\* The Megalicks of Paraguay: also certain large bones found in a nitrous cavern in Virginia, and presented to our society by its worthy President.

† Pennant. Jefferson.



has enabled me to detect. As it will furnish a corroborative presumption, if not a proof, that the Mammoth was carnivorous, or partly so, at least, I shall proceed to some observations on certain appearances at that saline, and which must have been familiar to the savages themselves.—I mean collections of bones of the various animals mentioned in the tradition.

The Great-Bone Lick is a shallow stream of salt water flowing into the Ohio. Upon either margin of the stream there lies a *stratum*, extending a considerable distance, composed entirely of the bones of the buffalo and other smaller animals noticed in the tradition above. From the effect of the mineral salt, these remains were in a state of high preservation—But, judge of my surprize, when attentively examining them, I discovered, that almost every bone of any length had received a fracture, occasioned, most likely, by the teeth of the Mammoth, while in the act of feeding on his prey.

It is well known that the buffalo, deer, elk and some other animals, are in the constant habit of making such places their resort; in order to drink the salt water and lick the impregnated earth. Now, may we not from these facts infer, that Nature had allotted to the Mammoth the beasts of the forest for his food? How can we otherwise account for the numerous fractures that every where mark these *strata* of bones? May it not be inferred, too, that as the largest and swiftest quadrupeds were appointed for his food, he necessarily was endowed with great strength and activity?—that, as the immense volume of the creature would unfit him for coursing after his prey through thickets and woods, Nature had furnished him with the power of taking it by a mighty leap?—

leap?—That this power of springing to a great distance was requisite to the more effectual concealment of his bulky volume while lying in wait for prey? The Author of existence is wise and just in all his works. He never confers an appetite without the power to gratify it.

With the agility and ferocity of the tiger; with a body of unequalled magnitude and strength, it is possible the Mammoth may have been at once the terror of the forest and of man!—And may not the human race have made the extirpation of this terrific disturber a common cause?

G. TURNER.

*Philadelphia, July 20th, 1797.*

*Description*